$P + O_2 \rightarrow P_2O_5$

$C + O_2 \rightarrow CO_2$

$CH_4 + O_2 \rightarrow CO_2 + H_2O$

https://youtu.be/KqQA-80yy6U

Oxides' formation

Reactions with oxygen:

$S + O_2 \rightarrow SO_2$

$2Mg + O_2 \rightarrow 2MgO$

$C + O_2 \rightarrow CO_2$

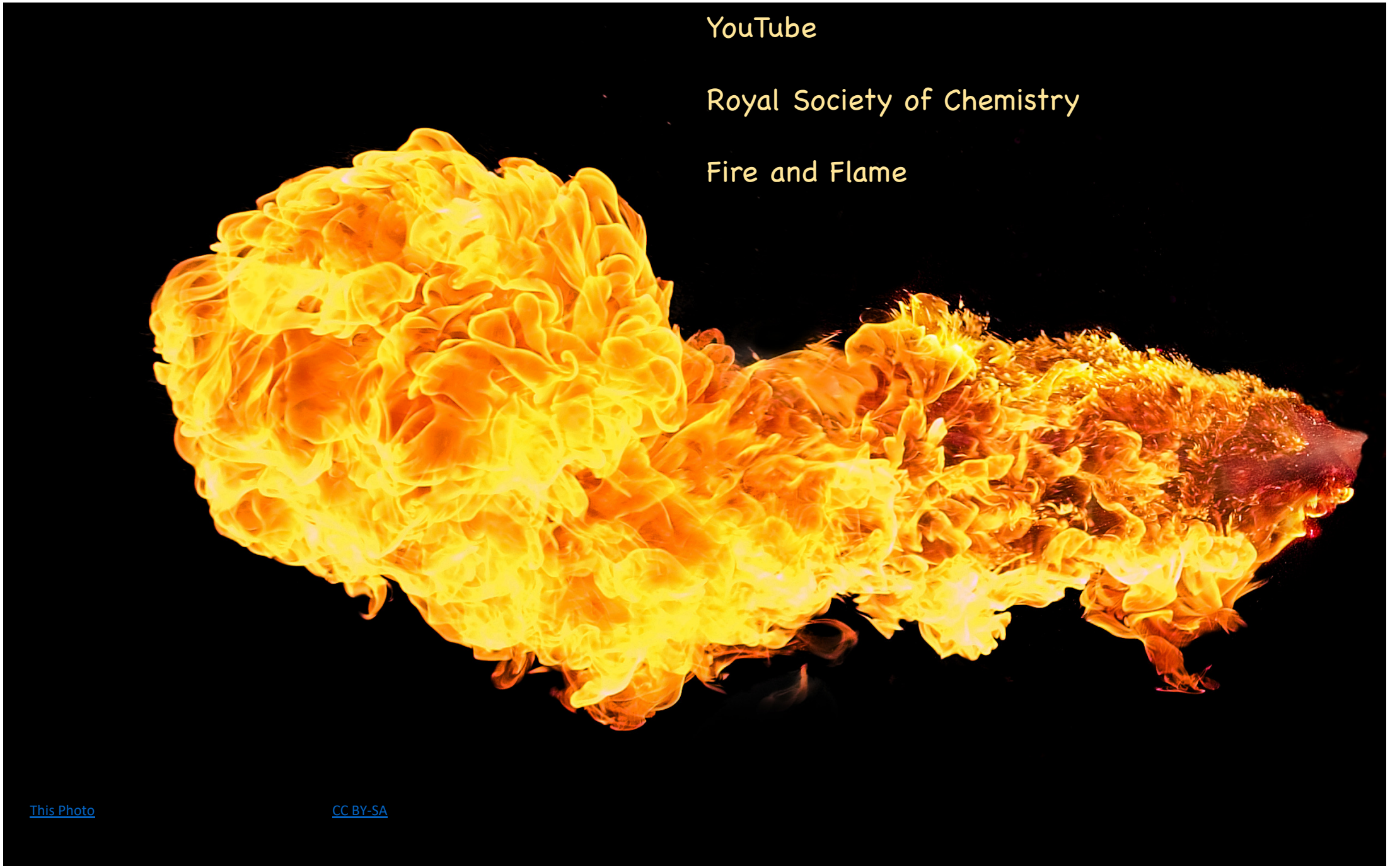
Oxides are chemical compounds with one or more oxygen atoms combined with another element.

https://youtu.be/kpCGIF8djms

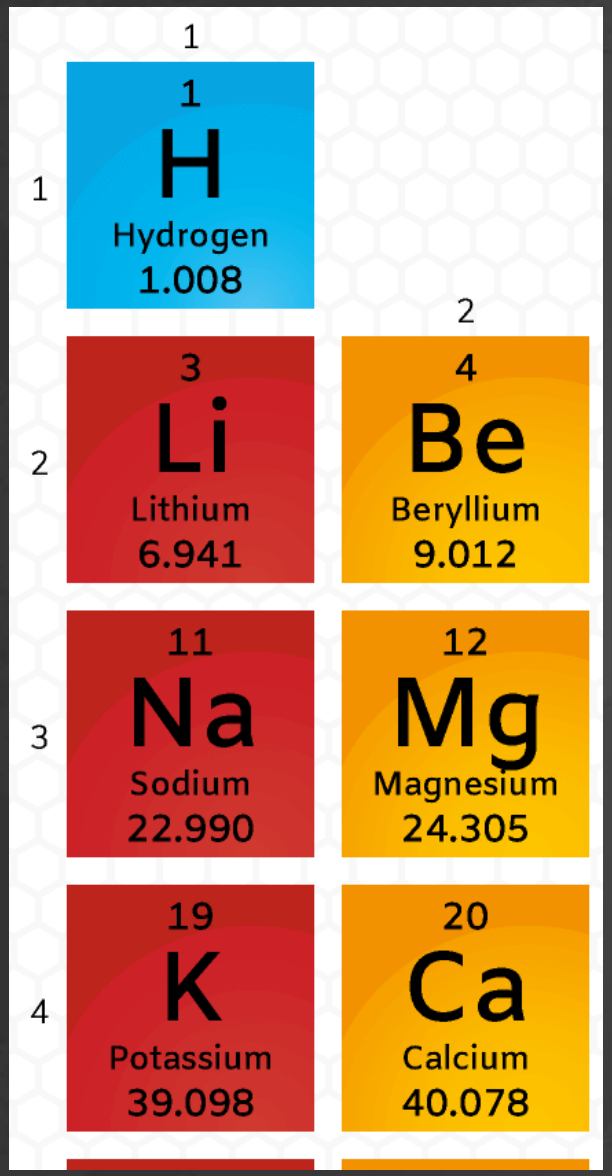
YouTube

Royal Society of Chemistry

Fire and Flame



Hydrogen



The most abundant element in the universe.

The charge of the nucleus - (+1)

The number of electrons - 1

Atomic mass - 1

Valence - I

Most common oxidation state - (+1)

Hydrogen molecule - H_2

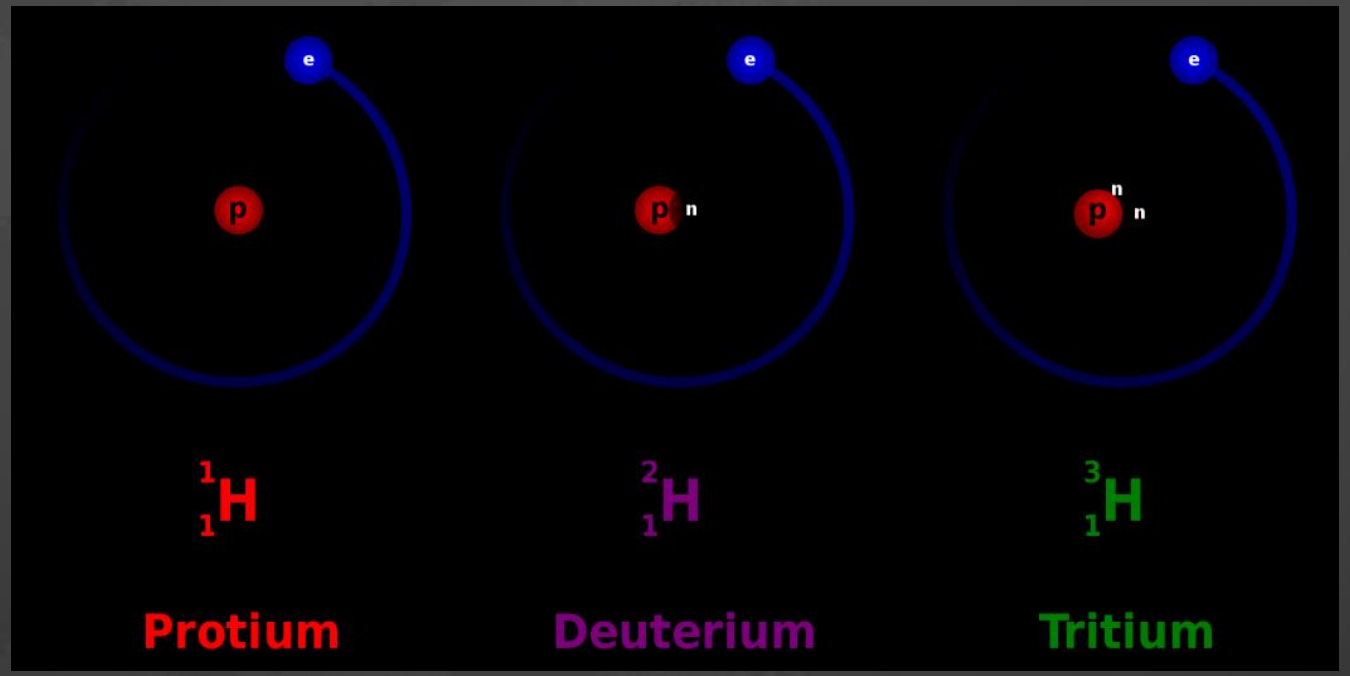
Molecular mass - 2 amu

Molar mass - 2 g/mole

$1s^1$

Hydrogen forms strong covalent molecules H_2.

It has 3 isotopes with different names:



The first electron shell can hold only 2 electrons. Hydrogen can lose its electron or acquire an electron for a stable configuration

$H = H^+ + 1e$ (positive ions of hydrogen no electrons)

$H + 1e = H^-$ (negative ion of hydrogen $1s^2$)

Obtaining H_2

HF, HCl, H_2O

$$Zn + 2HCl = H_2 + ZnCl_2$$

$$2\ Na + 2H_2O = H_2 + 2NaOH$$

$$3Fe + 4H_2O \overset{4}{=} H_2 + Fe_3O_4 \text{ (or } Fe_2O_3 \cdot FeO) \text{ (upon heating)}$$

https://youtu.be/zQaYLbsl33g

$$C + H_2O \rightarrow CO + H_2 \ (1000°C)$$

$$CH_4 + H_2O \rightarrow CO + 3H_2$$

$$CO + H_2O \rightarrow CO_2 + H_2$$

$$CH_4 + 2H_2O \rightarrow 4H_2 + CO_2 \ (1100°C)$$

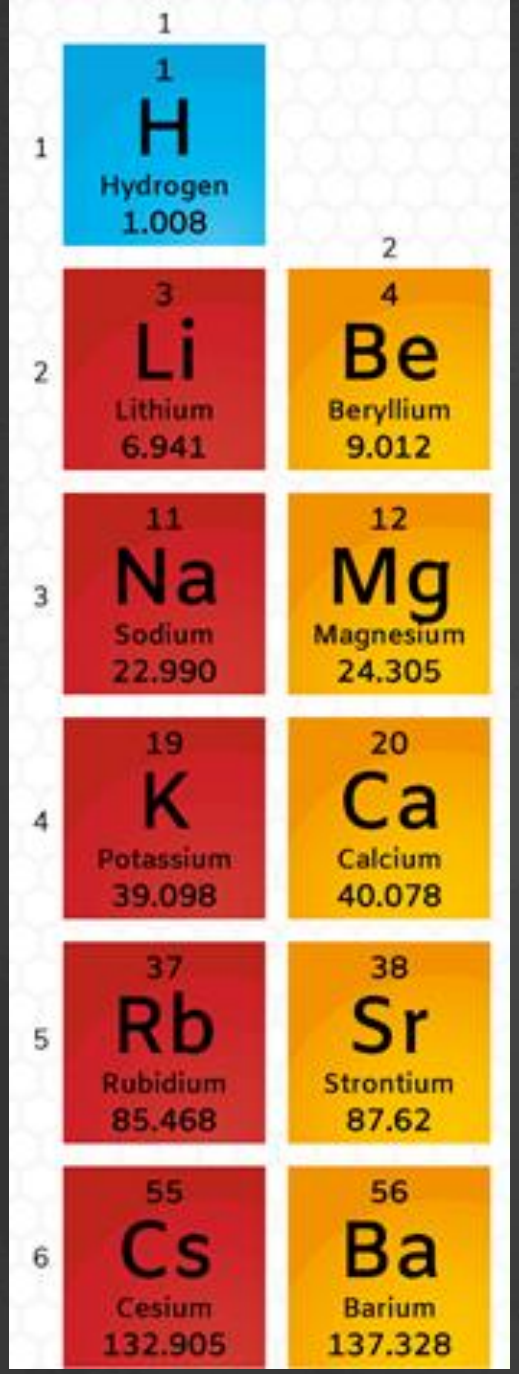
$$2H_2O \rightarrow O_2 + 2H_2$$ water electrolysis

Hydrogen reactions

$Ca + H_2 \rightarrow CaH_2 \quad 500^0$

$3H_2 + N_2 \rightarrow 2NH_3$

$CuO + H_2 \rightarrow Cu + H_2O$



Hydrogen Compounds

LiH^{-1}, BeH^{-1}_2, CaH^{-1}_2

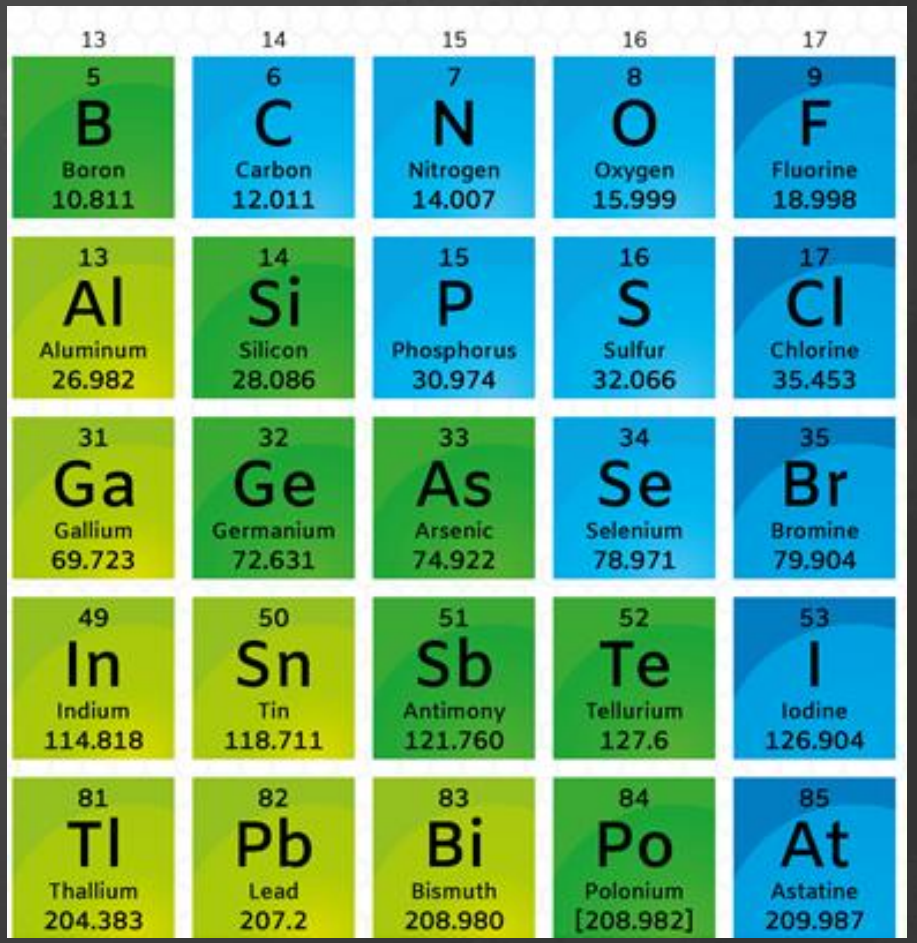
CH^{+1}_4

H^{+1}_2O

NH^{+1}_3

$H^{+1}F$, $H^{+1}Br$

AsH^{-1}_3



Hydrogen reaction with oxygen

Airship Hindenburg, 1937